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(54) Title: ELECTRIC CONDUCTORS

(57) Abstract: Electric wires are described consisting of a metallic wire able to conduct the electric current, the outer surface of which is coated in an alloy consisting of specific metals in set quantities.

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WO 2004/055834 A1

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Field of the invention

The present invention refers to the field of electric wires.

State of the art

5 The transmission of small and variable electric signals, like audio signals for example, is proving to be a much more complex phenomenon than known to the state of the art since in transmission of the electric signals, phenomena occur that are audible to the listener although they cannot be identified instrumentally, such as timbre, spatiality and harshness of the sound.

10 The distortion in high frequency or packing in medium audio frequency, caused by the copper used for the production of traditional electric wires, is audible and is immediately perceived by the silver wiring.

To overcome the above problem, the patent US 6,399,885 describes cables consisting of a number of wires, positioned in series or in parallel, each one made
15 of a different metal (in particular gold, copper or silver), said wires being insulated from each other and wrapped in a dielectric sheath.

Despite the validity of these wires they are obviously difficult to implement at industrial level given the necessary presence of gold and the manufacturing problems they entail.

20 Another solution consists in the application of filters or compensating networks in order to compensate for the various timbres or distortions produced by the metals of the components and wiring. The results are not completely satisfactory, however, and distortions remain which cannot be eliminated and which are perceived by the listener.

25 Hence the importance of eliminating the above negative factors associated with pure metals in view of the fact that the use of silver alone produces a very clear non-distorted sound but is rather faint and decidedly too metallic.

Summary of the invention

It has surprisingly been found that it is possible to solve the problem in an entirely
30 satisfactory manner by means of metal wires, on the surface of which an alloy is deposited consisting of appropriate metals in set percentages.

Furthermore, it has been found that the wires as described and claimed in the present application not only perfectly solve the above-mentioned problem but also permit other applications in which the purity of transmission of the electric signal is essential for obtaining excellent final performance.

5 Detailed description of the invention

The wires according to the invention consist of a normal metal wire able to conduct the current, for example a copper wire, the outer surface of which is covered in an alloy containing tin, antimony and copper.

10 Preferably the various metals constituting the alloy are present in the following concentrations:

Tin	from 74% to 98.9%
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Antimony	from 1% to 10%
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Copper	from 0.1% to 25%
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15 More preferably the alloy according to the invention consists of Tin 95%, Antimony 4%, Copper 1%.

Normally the qualities of the wire increase as the thickness of the alloy layer increases.

20 To obtain a wire according to the invention, the metallic wire is dipped in a bath consisting of the molten alloy. Obviously the time the wire is left in the bath will depend on the temperature of the bath, the type of metal constituting the wire and its dimensions in order to permit deposit of the alloy on the wire without the latter melting or being damaged by immersion for too long at an excessively high temperature.

25 If, for example, the wire is 0.40 mm in diameter, a bath with temperature between 300°C and 450°C is used, and the wire immersion time is approximately three seconds.

30 Before being dipped in the molten alloy bath, the metallic wire is preferably passed through a flux, of the type normally used in the welding of electrical material or in the manufacturing of electric circuits, for example rosin, and then left to dry; the flux improves adhesion of the molten alloy to the wire.

If preferred, before immersion in the alloy bath, the wire is pre-heated, for example to a temperature between 60° and 90°C.

Examples of production of wires according to the invention are given below.

Example 1

A copper wire, diameter 0.40 mm, is passed through rosin and left to dry; the wire is then pre-heated to 60° - 80°C.

- 5 The wire is then dipped, at a speed of 3 m/min., in a crucible containing a molten alloy consisting of tin (95%), antimony (4%) and copper (1%) at a temperature of approximately 400°C; the immersion time is approximately 3 seconds.

The wire, on which a layer of alloy is deposited, is then left to cool. Example 2

- 10 Example 1 is repeated using a 0.90 mm wire and dipping it at a speed of approximately 3.3 cm/sec., maintaining the alloy bath at a temperature of approximately 400°C.

Tests performed with wires produced according to the above examples show that the resolution increases considerably since in the audio or video field for example, the parameters linked to it increase: ambience, microcontrast and colour.

- 15 The wires according to the invention are suitable for a very wide range of uses, not only as connection cables for low level signals but also for connection cables for power supply, for printed circuit tracks, for coupling, signal, impulse and power transformers, for dipole, array and microstrip antennae, for connectors for signals or power supply and for electromagnetic screens.

- 20 In particular the invention refers to a power transformer, for electric distribution network, of analogue, digital and pulse signals and/or a coupling transformer, the windings of which are made of wires as described above.

Preferably the dielectric sheath used for the transformer according to the invention is made of black silk, preferably woven over the wire itself.

- 25 In particular, said transformers permit increase of the dynamics in audio signals, reducing the power supply noise; they also permit increase of the microinformation and ambience and change of the timbre in both recording and reproduction systems; said phenomena are also obtained in coupling transformers.

- 30 Using the power transformer with video systems, there was an increase in the colour and contrast and a reduction in noise.

Transformers for digital signals produced with wires as described above have provided much better results than those produced with other wire materials in the above parameters.

CLAIMS

1. Electric wire consisting of a metal able to conduct the current, the outer surface of which is covered in a layer of alloy containing tin, antimony and copper.
2. Wire according to claim 1 in which said alloy consists of: tin (74 - 98.9%),
5 antimony (1 - 10%) and copper (0.1 - 10%), said quantities being expressed in weight.
3. Wire according to claim 2 in which said alloy consists of: tin (95%), antimony (4%) and copper (1%), said quantities being expressed in weight.
4. Wire according to claims 1 - 3 in which said wire is a metal wire able to conduct
10 the current.
5. Wire according to claim 5 in which said metal wire is a copper wire.
6. Process for the preparation of a wire according to claims 1 - 5 in which the wire is passed through a flux and left to dry, pre-heated and then dipped in a bath consisting of the molten alloy.
- 15 7. Use of a wire according to claims 1 - 5 for the production of connection cables for low level signals, connection cables for power supply, printed circuit tracks and coupling, signal, pulse and power transformers, dipole, array and microstrip antennae, connectors for signals or power supply and for electromagnetic screens.
- 20 8. Connection cables for low level signals, connection cables for power supply, printed circuit tracks, coupling, signal, pulse and power transformers, dipole, array and microstrip antennae, connectors for signals or power supply and for electromagnetic screens.
9. Power transformer for electric distribution network, the windings of which are
25 made of a wire according to claims 1 - 5.
10. Transformer according to claim 7 in which the dielectric sheath is made of black silk, woven over the wire itself.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, CHEM ABS Data, WPI Data, PAJ

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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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